Peace and Economic Development
On the Border

Sandia's long interest in preventing global conflict is taking regional expression with the Bi-National Sustainability Laboratory. It's an effort with worldwide implications for peace and a stronger border economy.

The US-Mexican border: Poverty, lack of basic services such as public health, adequate water supplies, and other resources. These difficulties, combined with the collision of different cultures, easily provide the makings for conflict. Researchers at Sandia looked at the situation and asked a tough question: Can these difficulties be overcome in a peaceful way to nurture a technology-based, sustainable economy?

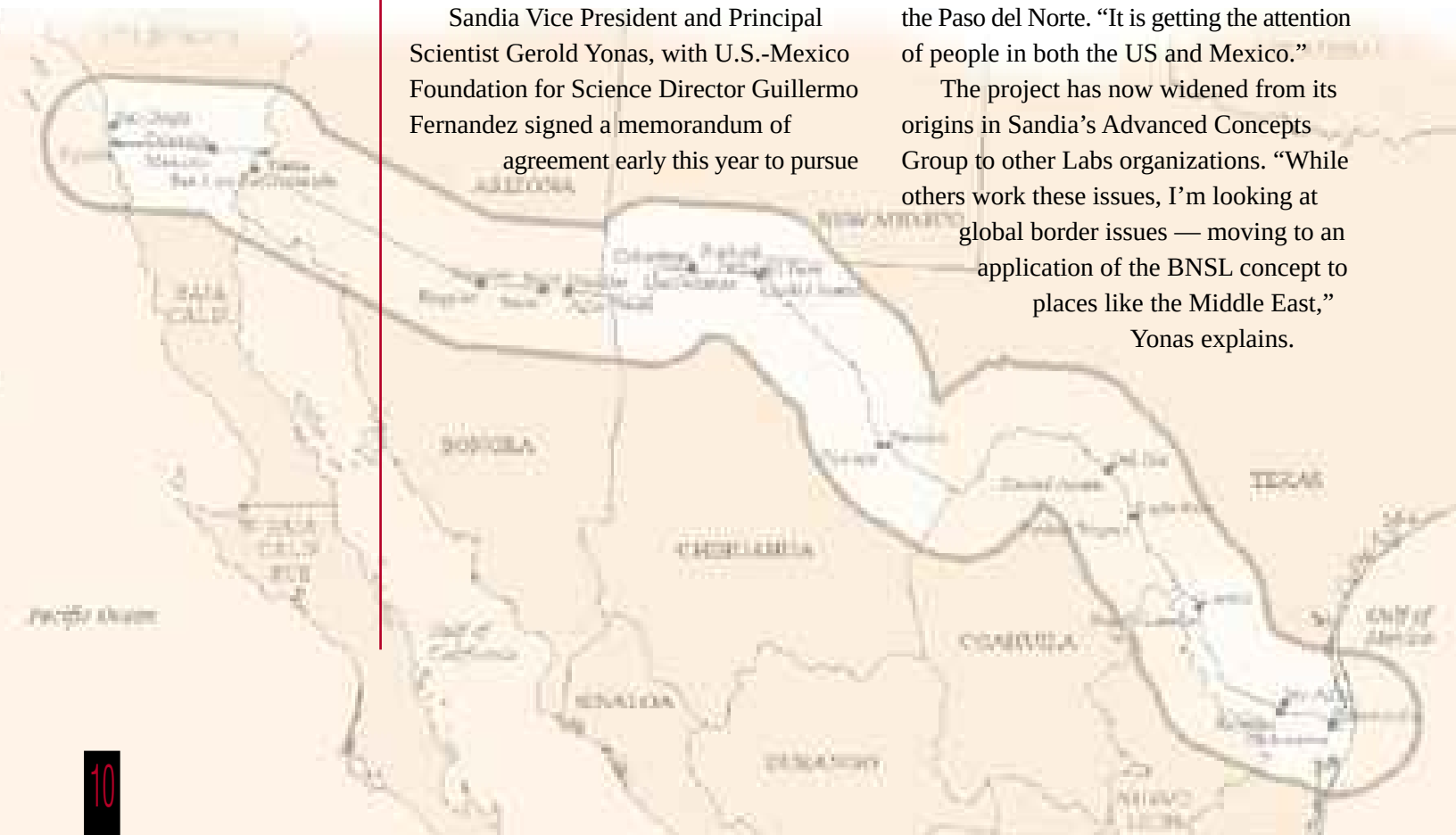
Their answer: The Bi-National Sustainability Laboratory (BNSL), a concept designed to create a new engine for economic development on both sides of the border. Further, the experience with Mexico can serve as a template for other regions of the world; regions in or on the verge of violent conflict.

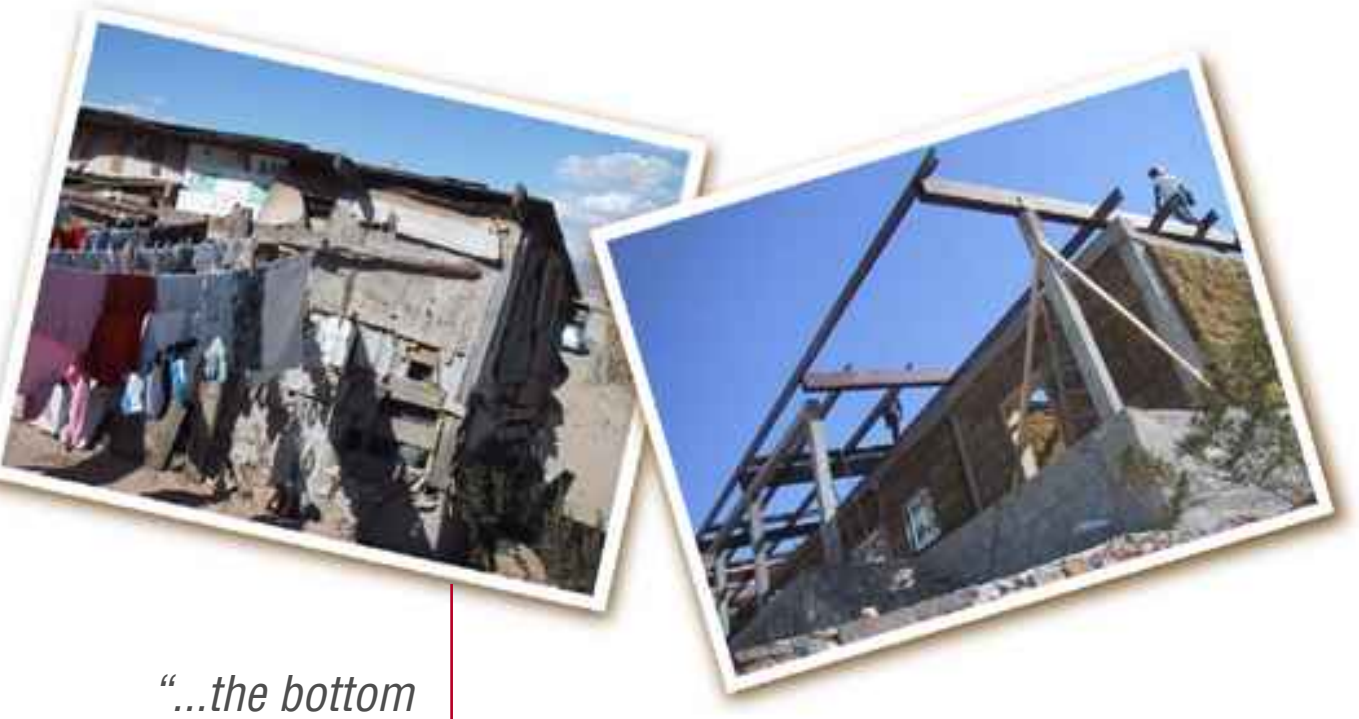
Sandia Vice President and Principal Scientist Gerold Yonas, with U.S.-Mexico Foundation for Science Director Guillermo Fernandez signed a memorandum of agreement early this year to pursue the project. Felipe Rubio Castillo, of Mexico's National Council on Science and Technology witnessed the document. In the months since, a number of activities have helped begin a focus for the BNSL concept.

"The signing of the MOU was an important step," Fernandez said of the event. "The Foundation is interested in the BNSL as a concrete way to strengthen economic and other ties on the border." The Mexican National Council on Science and Technology represents a group of 29 Mexican research centers, which are now partnering with Sandia.

"We have a big vision," says Vipin Gupta, Sandia researcher in the Advanced Concepts Group who has spent the past year and a half working on the BNSL concept in the Paso del Norte. "It is getting the attention of people in both the US and Mexico."

The project has now widened from its origins in Sandia's Advanced Concepts Group to other Labs organizations. "While others work these issues, I'm looking at global border issues — moving to an application of the BNSL concept to places like the Middle East," Yonas explains.





"...the bottom line for the border communities will be an improved quality of life."

From Idea to Program

Transition from idea to program is now under way in Sandia's Energy and Critical Infrastructure Strategic Business Unit and Sandia's Corporate Business Development center. Gary J. Jones, manager of the International Partnerships department in Sandia's Corporate Business Development center, cites a number of goals. Among them are:

- Foster long-term, sustainable economic development on both sides of the U.S.-Mexico border;
- Prevent conflict by creating community wealth and well-being across physical and psychological boundaries;
- Help create new small- and medium-sized enterprises, and to strengthen existing ones, resulting in increased numbers of higher paying jobs; and
- Bring new, advanced technologies to commercial fruition.

"Because of its unique role, it is difficult to envision the BNSL as a facility captive to any given US or Mexican government agency," says Jones. "Rather we anticipate that the BNSL will be managed by a non-profit entity capable of accepting funding from public and private institutions in both countries." He acknowledges that the economic goals will take years to fully achieve, but the bottom line for the border communities will be "an improved quality of life."

A spring meeting with both Sandia and Mexican representatives helped to identify some potential projects for BNSL. Five focus areas have been identified to take to a "workshop" level, where participants will convene to discuss specific areas and projects that might be feasible, explains Dan Horschel, manager of the Labs' Environmental Monitoring and Characterization department. "A lot of people are starting to engage and activities are getting under way. It's good to see us pulling together," Horschel says.

The focus areas identified to date include:

- Water and agriculture
- Public health issues
- Secure commerce
- New product development
- Energy and critical infrastructure

In Ciudad Juarez, Mexico's fourth largest city, effluent from two new water treatment plants has only recently begun to meet Environmental Protection Agency minimum standards for US water.

"There is tremendous interest in seeing this initiative work," says Lucinda Vargas, director of Plan Estrategico de Juarez. "Leaders in Juarez — speaking mostly from a private-sector perspective — have been present for briefings on how the initiative is progressing and have shown a willingness, desire, and even eagerness to commit their efforts at making this work."

Water Quality and Delivery

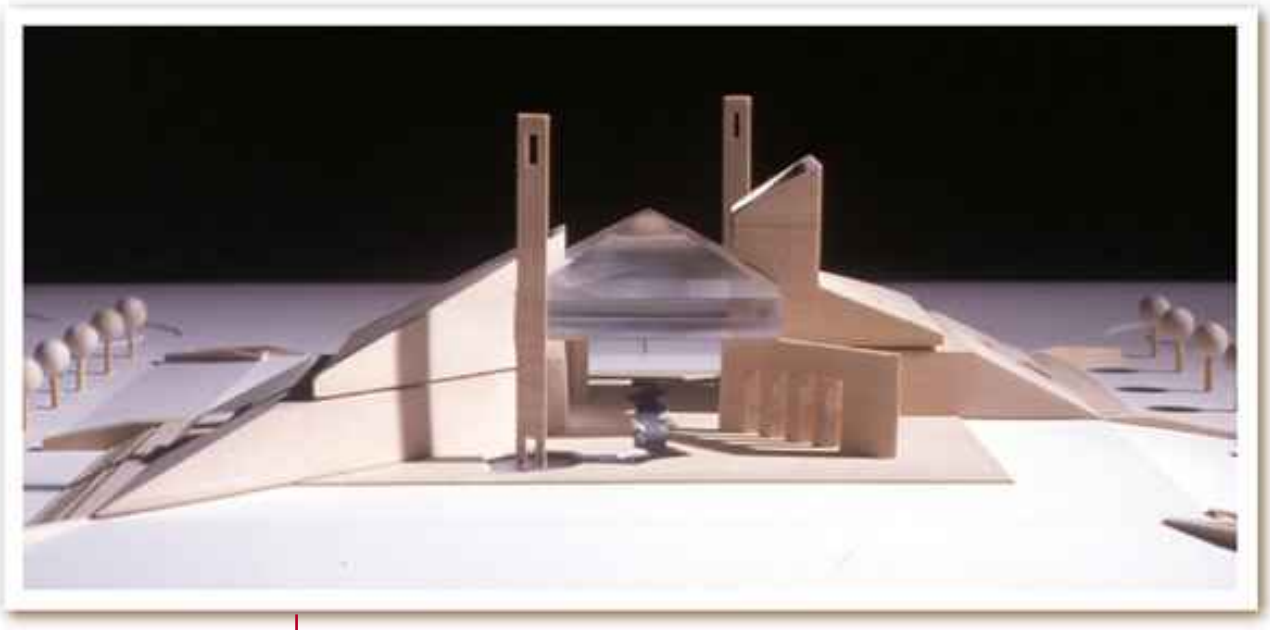
Gray Lowrey, a researcher in Sandia's Solar Thermal Technology department, spent a month this summer traveling with a group of scientists to look at water issues in the border state of Chihuahua, Mexico. On his 3,000-mile trek with other scientists from New Mexico, Lowrey saw numerous problems with water delivery and treatment.

In Ciudad Juarez, Mexico's fourth largest city, effluent from two new water treatment plants has only recently begun to meet Environmental Protection Agency minimum standards for US water. There is also speculation that the main fresh water resource for the city — the Hueco aquifer — may run dry within the next few years. In other parts of Chihuahua there are no water systems at all, he reports. People retrieve water from wells that are unprotected and often contaminated.

These problems have negatively affected the Mexican economy and driven rural workers into cities and north across the US-Mexican border.

The trip was part of a Rotary International Group Scientific Exchange. Upon its conclusion, US and Mexican representatives met at Taos, New Mexico, to discuss improved water delivery and purity for the borderlands. They generated a report outlining 15 projects Rotary Clubs could possibly implement over the next few years.

Another public health related project under way is the deployment of a Sandia-developed system to detect disease outbreaks. Deployed in southern New Mexico with the state's Department of Health, the Rapid Syndrome Validation



This architectural concept of a Bi-National Sustainable Laboratory (BNSL) illustrates the idea that this research effort should literally and figuratively straddle the US-Mexico border. Following formal agreements earlier this year, researchers are now beginning to put programs in place to make the BNSL a reality.

"Even a delay of one day in the early recognition of unusual patterns can mean the difference between saving or losing many lives with certain highly communicable diseases".

Project (RSVP) can provide timely information to physicians even before a major upswing in patient visits. The system tracks "syndromes" – which are carefully chosen combinations of signs and system that may reflect any of a myriad of specific disease types – rather than specific diseases. The latter requires laboratory testing (and the selection of the correct tests, of course) and thus is inherently delayed. "Time is of the essence in tracing any infectious disease outbreak," says Senior Sandia Scientist Alan Zelicoff, a physician/physicist who developed the system. "Even a delay of one day in the early recognition of unusual patterns can mean the difference between saving or losing many lives with certain highly communicable diseases".

Working with Dr. Gary Simpson of the New Mexico Department of Health, the system has been deployed at the Memorial Medical Center, the largest comprehensive medical-care campus in Las Cruces, New Mexico.

Dr. Catharine Torres, pediatrician and commissioner on the US-Mexico Border Health Commission, recently demonstrated the system by entering a case she was handling — a child with influenza-like symptoms. Thirty-three doctors, nurse practitioners and nurses have access to the center's RSVP system. Each case takes about 30 seconds to enter.

A Valuable Aid

"The system is a valuable aid, Says Dr. Torres. "Before we never really knew what the rest of the state was doing. The reporting system was slow and difficult. Now we can just push a button and get information."

Statistics indicate the system is catching on with hospitals, Zelicoff reports. In the Las Cruces case, the data in the system resulted in an alert to physicians about a sudden increase in flu and RSV, even before they began to see patients in their offices.